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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/648,050

08/26/2003

Akio Kitamura

FUJI:272

3175

7590

03/23/2005

ROSSI & ASSOCIATES

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EXAMINER

LE, THAO P

ART UNIT

PAPER NUMBER

2818

DATE MAILED: 03/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/648,050	Applicant(s) KITAMURA ET AL.	
	Examiner Thao P. Le	Art Unit 2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19-20 is/are allowed.
- 6) ☒ Claim(s) 1-6, 13-16 is/are rejected.
- 7) ☒ Claim(s) 7-12, 17 and 18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 August 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>8/26/03</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Acknowledge is made of applicants' claim for foreign priority base on an application 2002-315988 filed in Japan on 10/30/2002.

It is noted that Applicants have filled a certified copy of said application as required by U.S.C 119, which papers have been placed of record in the file.

Information Disclosure Statement

2. Information Disclosure Statement (IDS) filed on 08/26/03 and made of record. The references cited on the PTOL 1449 form have been considered.

Drawings

3. The drawings are objected to for the following reasons.

Figure 11-13 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

4. Claims 1-20 are pending.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. **Claim 1 is rejected under 35 USC 102 (b) as being anticipated by Suzuki et al., U.S. Patent No. 6,177,704.**

Regarding claim 1, Suzuki et al. discloses a semiconductor device comprising
(See Figs. 1-10 and depending portions of specification):

A semiconductor region of a first conductivity type (14/16, Fig. 1);

A source region 18 of a second conductivity type in one side of the semiconductor region;

A drain region 20 of the second conductivity type in the one side of the region and spaced apart from the source region (Fig. 1);

Trenches 52 (Fig. 2C) in the one side of the region, between the source region and the drain region, and spaced apart laterally from the source region;

An insulator 30 filling each of the trenches;

A drain drift region 14a of the second conductivity type in the region, the drain drift region being connected to the drain region, the drain drift region extending along side and bottom walls of the trenches (ABC, Fig. 1), the drain drift region being spaced apart from the source region (by layer 42, Fig. 1);

A gate insulation film 42 on the surface of region between the source region and drain drift region;

A gate electrode 40 on the gate insulation film;

A source electrode 44 connected electrically to the source region;

A drain electrode 46 connected electrically to the drain region;

And a first triple layer structure (regions 14, 14a between trenches) from of the drain drift region and being between the adjacent trenches such that the drain drift region is between the adjacent trenches; wherein the trenches are aligned in the width direction of the channels formed beneath the gate insulation film 42 (Fig. 1).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2-6, 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al., U.S. Patent No. 6,177,704 in view of Fujishima et al., U.S. Patent No. 5,701,026.

Regarding claims 2-6, 13-16, Suzuki et al. discloses the limitations of claim 1 but fails to disclose a second triple layer structure or the field relaxation layer in the drain drift region. Fujishima et al. discloses the MOSFET device and further discloses the second triple layer or relaxation layer 104 formed of the drain drift region. It would have been obvious to one having ordinary skill in the art at the time the invention was made to form a layer structure or relaxation layer in the drain drift region along the trench because the layer formed as an insulator or barrier between the drain drift and trenches.

Claim Objection

9. Claim 7-12, 17-18 are **objected** to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, since the prior art made of record and considered pertinent to the applicant's disclosure does not teach or suggest the claimed limitations having a semiconductor device comprising, among other features cited in independent claim 1, one or more electrical conductors in the insulator in each

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of the trenches, and extending parallel to a side wall of the trenches formed between adjacent trenches.

Reasons for Indication of Allowable Subject Matter

10. Claims 19-20 are allowed.

The following is a statement of reason for the indication of allowable subject matter: Claims 19-20 are allowable since none of prior art teach or suggest the claimed limitations having a semiconductor device comprising, among other features cited in independent claim 19, one or more electrical conductors in the insulator in each of the trenches, and extending parallel to a side wall of the trenches formed between adjacent trenches.

If Applicants are aware of better art than that which has been cited, they are required to call such to attention of the examiner.

When responding to the office action, Applicants' are advice to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao P. Le whose telephone number is 571-272-1785. The examiner can normally be reached on M-T (7-6).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 571-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Thao P. Le', with a stylized, cursive script.

Thao P. Le
Examiner
Art Unit 2818
March 17, 2005.